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CORRECTION
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Corrigendum: Estimating the Minimal Number of Repeated Examinations for Random Responsiveness With the Coma Recovery Scale—Revised as an Example

Hao Yang[1†], Chengyin Ye[2†], Xiaochen Liu[1], Lingxiu Sun[1], Anqi Wang[1], Jing Wang[1], Nantu Hu[1], Xiaohua Hu[3], Olivia Gosseries[4], Steven Laureys[4], Haibo Di[1] and Jiqian Fang[5*]*

[1] International Unresponsive Wakefulness Syndrome and Consciousness Science Institute, Hangzhou Normal University, Hangzhou, China, [2] Department of Health Management, School of Public Health, Hangzhou Normal University, Hangzhou, China, [3] Hangzhou Wujing Hospital, Hangzhou, China, [4] Coma Science Group, GIGA- Consciousness and Centre du Cerveau, University and University Hospital of Liège, Liège, Belgium, [5] School of Public Health, Sun Yat-sen University, Guangzhou, China

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Edited by:
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***Correspondence:**
Jiqian Fang
fangjq@mail.sysu.edu.cn
Haibo Di
dihaibo19@aliyun.com

† These authors have contributed equally to this work and share first authorship

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A Corrigendum on

Estimating the Minimal Number of Repeated Examinations for Random Responsiveness With the Coma Recovery Scale—Revised as an Example
by Yang, H., Ye, C., Liu, X., Sun, L., Wang, A., Wang, J., Hu, N., Hu, X., Gosseries, O., Laureys, S., Di, H. and Fang, J. ((2021). Front. Integr. Neurosci. 15:685627. doi: 10.3389/fnint.2021.685627

In the original article, there was a mistake in the legend for Table 5 as published. "$\hat{k}_{\min}$" **was missed**. The correct legend appears below.

The numbers of repeated examination $\hat{k}_{\min}$ for $p_i \equiv p$, $p_i \sim N(p, 0.3^2)$ and $p_i \sim U(p-0.3, p+0.3)$ *

In the original article, there was a mistake in **Table 1** as published. **The mathematical symbols were misexpressed.** The corrected **Table 1** appears below.

In the original article, there was a mistake in **Table 2** as published. **The mathematical symbols were misexpressed.** The corrected **Table 2** appears below.

In the original article, there was a mistake in **Table 3** as published. **The mathematical symbols were misexpressed.** The corrected **Table 3** appears below.

In the original article, there was some errors. **The mathematical symbols were misexpressed**. A correction has been made to **Materials and methods, Development of statistical formulas, Data and formulas, Paragraph 2:**

Since both of a_1/n and any of the formulas in the 5-th column of **Table 1** approximate to the same probability of positive response to a single examination given by a MCS patient, we have

TABLE 1 | Pooled estimate for the probability of positive response to a single examination given by an MCS patient in theory.

No. of rounds *i*	No. of MCSs giving positive response	Total no. of MCS assessed	Proportion	Pooled estimate for the probability of positive response to a single examination given by an MCS
1	a_1	n	$\frac{a_1}{n}$	$\frac{a_1}{n}$
2	a_2	$n - a_1$	$\frac{a_2}{n - a_1}$	$\frac{a_1 + a_2}{n + (n - a_1)}$
3	a_3	$n - a_1 - a_2$	$\frac{a_3}{n - a_1 - a_2}$	$\frac{a_1 + a_2 + a_3}{n + (n - a_1) + (n - a_1 - a_2)}$
…	…	…	…	…
i	a_i	$n - a_1 - \ldots - a_{i-1}$	$\frac{a_i}{n - a_1 - \cdots - a_{i-1}}$	$\frac{a_1 + a_2 + \cdots + a_i}{n + (n - a_1) + \cdots + (n - a_1 - a_2 - \cdots - a_{i-1})}$

MCS, minimally conscious state.

TABLE 2 | Estimation for a total number of MCS patients and their probability of giving positive response to a single examination.

No. of rounds *i*	No. of MCSs giving positive response a_i	Estimated total no. of MCSs $\hat{n}_i$	Estimated probability of positive response to a single examination given by an MCS $\hat{p}_i$
1	a_1		
2	a_2	$\hat{n}_2 = \frac{a_1^2}{a_1 - a_2}$	$\hat{p}_2 = \frac{a_1 - a_2}{a_1}$
3	a_3	$\hat{n}_3 = \frac{a_1(2a_1 + a_2)}{2a_1 - a_2 - a_3}$	$\hat{p}_3 = \frac{2a_1 - a_2 - a_3}{2a_1 + a_2}$
…	…	…	…
i	a_i	$\hat{n}_i = \frac{a_1[(i-1)a_1 + (i-2)a_2 + \cdots + a_{i-1}]}{(i-1)a_1 - a_2 - \cdots - a_i}$	$\hat{p}_i = \frac{(i-1)a_1 - a_2 - \cdots - a_i}{(i-1)a_1 + (i-2)a_2 + \cdots + a_{i-1}}$

MCS, minimally conscious state.

$$\frac{a_1}{n} \approx \frac{a_1 + a_2}{n + (n - a_1)},$$
$$\frac{a_1}{n} \approx \frac{a_1 + a_2 + a_3}{n + (n - a_1) + (n - a_1 - a_2)}$$

and

$$\frac{a_1}{n} \approx \frac{a_1 + \cdots + a_i}{n + (n - a_1) + \cdots (n - a_1 - \cdots - a_{i-1})}$$

Denote their solutions of n, respectively, by

$$\hat{n}_2 \approx \frac{a_1^2}{a_1 - a_2}, \quad \hat{n}_3 \approx \frac{a_1 (2a_1 + a_2)}{2a_1 - a_2 - a_3}$$

and

$$\hat{n}_i \approx \frac{a_1 [(i-1) a_1 + (i-2) a_2 + \cdots + a_{i-1}]}{(i-1) a_1 - a_2 - \cdots - a_i}, \quad \hat{p}_i = \frac{a_1}{\hat{n}_i}$$

These formulas have been summarized in **Table 2**.

A correction has been made to **Materials and methods, Validation by stochastic simulation**, **"Examination" and "responses," Paragraph 1:** [0, 1]. **Paragraph 3:** $\hat{n} = \sum_{i=1}^{\hat{k}_{\min}} a_i$, the rate of missed diagnosis $(n - \hat{n})/n$.

A correction has been made to **Materials and methods, Validation by stochastic simulation**, **Repeated simulation and the rate of missed diagnosis, Paragraph 1:** $(n - \hat{n})/n$.

A correction has been made to **Results, Outcome of Bedside examinations**, **For TBI patients, Paragraph 1–6:**

After completing the first 2 rounds of examinations we obtained the numbers of MCSs giving positive response $a_1 = 30$ and $a_2 = 3$, using the formulas in the second row of **Table 2**, we had the estimated n and p as

$$\hat{n}_2 \approx \frac{a_1^2}{a_1 - a_2} = \frac{900}{27} = 33.33,$$
$$\hat{p}_2 \approx \frac{a_1}{\hat{n}_2} = \frac{30}{33.33} = 0.9001$$

Since

$$(1 - \hat{p}_2)^k \geq 0.0001, k = 2, 3, 4,$$
$$(1 - \hat{p}_2)^5 = 0.00001 < 0.0001$$

the examination should be kept on going, and might be ended at the 5-th round; and the total number of MCS patients in this group of DOCs might be around 34.

TABLE 3 | The data collected from the 13 rounds of successive examinations.

Group	No. of MCSs giving positive response in each round of examinations													MCS	UWS/VS	Total
	a_1	a_2	a_3	a_4	a_5	a_6	a_7	a_8	a_9	a_{10}	a_{11}	a_{12}	a_{13}			
TBI	30	3	3	2	0	0	0	0	0	0	0	0	0	38	12	50
NTBI	29	3	2	1	0	0	0	0	0	0	0	0	0	35	15	50

MCS, minimally conscious state; UWS/VS, unresponsive wakefulness syndrome/vegetative state; TBI, traumatic brain injury; NTBI, non-traumatic brain injury.

After completing the 3rd round, we obtained $a_3 = 3$, and

$$\hat{n}_3 \approx \frac{a_1\,(2a_1 + a_2)}{2a_1 - a_2 - a_3} = \frac{30 \times 63}{54} = 35,$$
$$\hat{p}_3 \approx \frac{a_1}{\hat{n}_3} = \frac{30}{35} = 0.8571$$

Since

$$(1 - \hat{p}_3)^i \geq 0.0001,\ i = 3, 4,$$
$$(1 - \hat{p}_3)^5 = 0.00006 < 0.0001$$

the examination should be kept on going, and might be ended at the 5-th round; and the total number of MCS patients in this group of DOCs might be around 35.

After completing the 4-th round, we obtained $a_4 = 2$, and

$$\hat{n}_4 \approx \frac{a_1\,(3a_1 + 2a_2 + a_3)}{3a_1 - a_2 - a_3 - a_4} = \frac{30 \times 99}{82} = 36.22,$$
$$\hat{p}_4 \approx \frac{a_1}{\hat{n}_4} = \frac{30}{36.22} = 0.8283$$

Since

$$(1 - \hat{p}_4)^i \geq 0.0001, i = 4, 5,$$
$$(1 - \hat{p}_4)^6 = 0.00003 < 0.0001$$

the examination should be kept on going, and might be ended at the 6-th round, and the total number of MCS patients in this group of DOCs might be around 37.

After completing the 5-th round, we obtained $a_5 = 0$, and

$$\hat{n}_5 \approx \frac{a_1\,(4a_1 + 3a_2 + 2a_3 + a_4)}{4a_1 - a_2 - a_3 - a_4 - a_5} = \frac{30 \times 137}{112} = 36.70,$$
$$\hat{p}_5 \approx \frac{a_1}{\hat{n}_5} = \frac{30}{36.70} = 0.8175$$

Since

$$(1 - \hat{p}_5)^5 = 0.00020,$$
$$(1 - \hat{p}_5)^6 = 0.00004 < 0.0001$$

the examination should be kept on going, and perhaps ended at the 6-th round; and the total number of MCS patients in this group of DOCs might be around 37.

After completing the 6-th round, we obtained $a_6 = 0$, and

$$\hat{n}_6 \approx \frac{a_1(5a_1 + 4a_2 + 3a_3 + 2a_4 + a_5)}{5a_1 - a_2 - a_3 - a_4 - a_5 - a_6} = \frac{30 \times 175}{142} = 36.97,$$
$$\hat{p}_6 \approx \frac{a_1}{\hat{n}_6} = \frac{30}{36.97} = 0.8114$$

Since

$$(1 - \hat{p}_6)^6 = 0.00005 < 0.0001,$$

the examination could be ended at this round $\hat{k}_{\min} = 6$.

And up to this round, the total number of MCS patients had been detected in the group of DOCs was

$$\hat{n} = a_1 + a_2 + a_3 + a_4 + a_5 + a_6 = 38$$

A correction has been made to **Results, Outcome of Bedside examinations**, **For NTBI patients, Paragraph 1–4:**

After completing the first two rounds of examination we obtained the numbers of MCSs giving positive response $a_1 = 29$ and $a_2 = 3$, using the formulas in the second row of **Table 2**, we had

$$\hat{n}_2 = \frac{a_1^2}{a_1 - a_2} = \frac{29^2}{26} = 32.35,$$
$$\hat{p}_2 \approx \frac{a_1}{\hat{n}_2} = \frac{29}{32.35} = 0.8966$$

Since

$$(1 - \hat{p}_2)^i \geq 0.0001,\ i = 2, 3, 4,$$
$$(1 - \hat{p}_2)^5 = 0.000012 < 0.0001$$

the examination should be kept on going, and might be ended at the 5-th round; and the total number of MCS patients in this group of DOCs might be 33.

After completing the 3rd round, we obtained $a_3 = 2$, and

$$\hat{n}_3 = \frac{a_1\,(2a_1 + a_2)}{2a_1 - a_2 - a_3} = \frac{29 \times 61}{53} = 33.38,$$
$$\hat{p}_3 \approx \frac{a_1}{\hat{n}_3} = \frac{29}{33.38} = 0.8689$$

Since

$$(1 - \hat{p}_3)^i \geq 0.0001,\ i = 3, 4,$$
$$(1 - \hat{p}_3)^5 = 0.000039 < 0.0001$$

the examination should be kept on going, and might be ended at the 5-th round; and the total number of MCS patients in this group of DOCs might be 34.

After completing the 4-th round, we obtained $a_4 = 1$, and

$$\hat{n}_4 = \frac{a_1\,(3a_1 + 2a_2 + a_3)}{3a_1 - a_2 - a_3 - a_4} = \frac{29 \times 95}{81} = 34.01,$$
$$\hat{p}_4 \approx \frac{a_1}{\hat{n}_4} = \frac{29}{34.01} = 0.8526$$

Since

$$(1 - \hat{p}_4)^4 = 0.000472 \geq 0.0001,$$
$$(1 - \hat{p}_4)^5 = 0.000070 < 0.0001$$

the examination could be ended at 5-th round; and the total number of MCS patients in this group of DOCs might be 35.

After completing the 5-th round, we obtained $a_5 = 0$, and

$$\hat{n}_5 = \frac{a_1\,(4a_1 + 3a_2 + 2a_3 + a_4)}{4a_1 - a_2 - a_3 - a_4 - a_5} = \frac{29 \times 130}{110} = 34.27,$$
$$\hat{p}_5 \approx \frac{a_1}{\hat{n}_5} = \frac{29}{34.27} = 0.8462$$

Since

$$(1 - \hat{p}_5)^5 = 0.000086 < 0.0001$$

the examination could be ended at this round $\hat{k}_{\min} = 5$ and up to this round, the total number of MCS patients had been detected in the group of DOCs was

$$\hat{n} = a_1 + a_2 + a_3 + a_4 + a_5 = 35$$

The authors apologize for the errors and state that this does not change the scientific conclusions of the article in any way. The original article has been updated.

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